

REMARKS

Claims 1-20 are pending in the present invention. Claims 1, 5 and 6 have been amended. This amendment is being submitted along with a Request for Continued Examination under 37 C.F.R. § 1.114 and the requisite fee.

Claims 1-20 were rejected in the outstanding Office Action. Applicants respectfully traverse these rejections in the remarks that follow below.

Claim Rejections under 35 U.S.C. 102:

Claims 1, 3-7, 14, 17-18 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,338,363 to Kawata et al (hereinafter "Kawata"). In response, Applicant respectfully submits that the rejection of these claims under 35 U.S.C. 102(b) may not be maintained because each and every element set forth in amended claim 1 is not found in Kawata.

Claim 1 has been amended to recite a thin film deposition reactor comprising, *inter alia*, a first connection line in communication with the shower head plate for supplying a first reaction gas and an inert gas; a second connection line in communication with the shower head plate for supplying a second reaction gas and the inert gas; and a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which is in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and the inert gas onto the wafer, and a plurality of nozzles which is in communication with a passage radially formed from the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and the inert gas toward edges of the wafer, whereby the first and second reaction gases are applied on the wafer without mixing each other.

In claim 1, the spray holes (131) for applying the first reaction gas and the inert gas to the

wafer (W) are communicated with the first connection line (121), and the nozzles (133) for applying the second reaction gas and the inert gas to the wafer (W) are communicated with the passage (132) radically formed from the second connection line (122). Thus, the first reaction gas is applied to the wafer (W) only through the spray holes (131) and the first connection line (121), and the second reaction gas is applied to the wafer (W) only through the nozzles (133), the passage (132) and the second connection line (122). Accordingly, the first and second reaction gases, in claim 1, are not mixed in a reactor block (110), and deposited on the wafer (W) by ALD (Atomic Layer Deposition) method.

On the contrary, Kawata discloses a chemical vapor deposition (CVD) method in which a first reaction gas (SiH_4) and a second reaction gas (O_2) are mixed in a mixing chamber (17 in Fig. 10 of Kawata) before applied to a wafer. For instance, the first and second reaction gases are supplied from reaction gas supply units (19a and 19b) and mixed in the mixing chamber (17). The mixed reaction gas (21) is applied to a semiconductor substrate (6) through reaction gas introduction holes (12). An inert gas injection hole (25 in Fig. 5) introduces an inert gas supplied from a first inert gas passage (28), but does not introduce any of the reaction gases. Further, the inert gas injection hole (25) does not communicate with any passage formed from the reaction gas supply units (19a and 19b).

Thus, Kawata neither discloses nor teaches the elements: a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which is in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and the inert gas onto the wafer, and a plurality of nozzles which is in communication with a passage radically formed from the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and the inert gas toward edges of the wafer, whereby the first and second reaction gases are applied on the

wafer without mixing each other, as claimed in claim 1.

Further, the inert gas, in claim 1, is supplied from the first and second connection lines (121 and 122), while the inert gases, in Kawata, are supplied from first and second inert gas passages (28 and 33 in Fig. 1 of Kawata). The inert gas passage (28) does not supply any of the first and second reaction gases into the mixing chamber (17). Thus, Kawata neither discloses nor teaches the element: a second connection line in communication with the shower head plate for supplying a second reaction gas and the inert gas, as claimed in claim 1.

Accordingly, Kawata does not anticipate or render obvious claim 1. Claims 3-7, 14, 17-18 and 20 depend from claim 1, thus include all the limitations of claim 1. It is thus believed that claims 3-7, 14, 17-18 and 20 are believed to be allowable due to their dependency on claim 1.

Therefore, the reconsideration and withdrawal of the claim rejection under 35 U.S.C. 102(b) are respectfully requested.

Claim Rejections under 35 U.S.C. 103:

Claims 2 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5, 439,524 to Cain et al (hereinafter “Cain”).

Claims 8, 9 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5,976,261 to Moleshi et al (hereinafter “Moleshi”).

Claims 10 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Kawata in view of U.S. Patent No. 5,425,812 to Tsutahara et al (hereinafter “Tsutahara”).

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata and Tsutahara in view of Japanese Patent No. 09-316644 to Arai et al (hereinafter “Arai”).

Claim 13 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5,076,207 to Washitani et al (hereinafter “Washitani”).

Claim 16 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view

of Arai.

As discussed with regard to the rejection of claim 1 under 35 U.S.C. 102, Kawata fails to teach or suggest the elements: a second connection line in communication with the shower head plate for supplying a second reaction gas and the inert gas; and a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which is in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and the inert gas onto the wafer, and a plurality of nozzles which is in communication with a passage radically formed from the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and the inert gas toward edges of the wafer, whereby the first and second reaction gases are applied on the wafer without mixing each other, as claimed in claim 1.

Further, claim 1 discloses a thin film deposition reactor in which first and second reaction gases are applied to a wafer without mixing each other. Thus, the reaction gases, in claim 1, are deposited on the wafer with ALD method. On the contrary, Kawata discloses a CVD method in which the first and second reaction gases are mixed in a mixing chamber before applied to the wafer. Thus, Kawata is different from claim 1. Accordingly, there is no motivation in Kawata to modify Kawata to arrive at the invention of claim 1.

Furthermore, any of Cain, Moleshi, Tsutahara, Arai and Washitani does not teach or suggest the features of amended claim 1. Thus, the subject matter of amended claim 1 is not rendered obvious by Kawata, Cain, Moleshi, Tsutahara, Arai and Washitani, either individually or in combination.

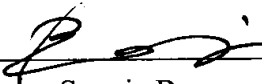
Claims 2, 8-13, 15-16 and 19 depend from claim 1, and claims 2, 8-13, 15-16 and 19 are believed to be allowable due to their dependency on claim 1.

Conclusion

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims, as amended herein, are now allowable to Applicant. Thus, reconsideration and allowance are respectfully requested.

The Examiner is invited to contact Applicant's attorneys at the below-listed phone number with any questions. If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorneys.

Respectfully submitted,

By: 

Soonja Bae

Registration No: See Attached

CANTOR COLBURN LLP

55 Griffin Road South

Bloomfield, CT 06002

Tel: 860-286-2929

Customer No. 23413

Date: July 21, 2003